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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/597,608

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EXAMINER

CONNELLY CUSHWA, MICHELLE R

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/597,608	Applicant(s) VERSTEGEN ET AL.	
	Examiner MICHELLE R. CONNELLY CUSHWA	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-17 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3/9/08 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in the European Patent Office on February 6, 2004. It is noted, however, that applicant has not filed a certified copy of the EPO 04100449.0 application as required by 35 U.S.C. 119(b).

Drawings

Three (3) sheets of formal drawings were filed on March 9, 2008 and have been accepted by the Examiner.

Specification

Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4-7, 9-13 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (US 5,150,234).

Regarding claim 1; Takahashi et al. discloses a camera arrangement (see Figures 1 and 3) integrally comprising at least two lenses (1, 3 and 7 in Figure 1; 1, 19 and 7 in Figure 3) and a photo sensor (solid state image pick-up element,

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8) in a fixed configuration forming one unit, wherein a first lens (3 in Figure 1; 19 in Figure 3) of the lenses has an adjustable focal length and comprises:

- a first liquid crystal cell comprising a first alignment surface (11 in Figure 1; 22 in Figure 3) and a second alignment surface (11 in Figure 1; 22 in Figure 3), at least one of the alignment surfaces being a lens-shaped surface (see Figures 1 and 3) defined by a polymer body (acrylic resin; see column 4, lines 50-54), the liquid crystal cell further comprising a layer of liquid crystal molecules (12 in Figure 1; 23 in Figure 3) that have an anisotropic index of refraction and that are arranged between the alignment surfaces such that a predefined molecule orientation is induced; and
- a pair of electrodes (10 in Figure 1; 21 in Figure 3) provided on opposite sides of the layer of liquid crystal molecules (12 or 23) and operative to control an index of refraction in the layer of liquid crystal molecules by means of an electric field applied therein;
- wherein the lenses are arranged in a fixed configuration such that the camera arranged has an adjustable depth of focus (see the abstract and Figures 1 and 3).

Takahashi et al. does not specifically state that the photo sensor is a photo sensor array, however, one of ordinary skill in the art would have found it

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obvious to use a CCD array as the solid state image pick-up element, since CCD arrays are well known and commonly used solid state image pick-up elements, Takahashi et al. does teach that a solid-state image pick-up element (8) is used in the invention, and Takahashi et al. does not suggest the use of a particular elements, thereby suggesting to one of ordinary skill in the art that any well known image sensor, including a CCD array, would work well with the invention.

Regarding claim 2; the first lens (3 or 19) is operative for light of a predefined polarization that depends on the orientation of the liquid crystal molecules, and the camera arrangement comprises a polarizer (2; see column 5, lines 10-14) that is transparent for light of the predefined polarization only.

Regarding claim 4; the second lens has an adjustable focal length and the first and second lenses are arranged such that the camera arrangement has an adjustable depth of field.

Regarding claim 5; additional electronic components are inherently required to receive the electric signal produced by the sensor (8) for display and/or viewing.

Regarding claim 6; the recitation "mobile phone" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hira*, 535

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F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Regarding claims 7, 9, 10, 15 and 17; Takahashi et al., as discussed above with respect to claim 1, teaches a method of manufacturing a camera arrangement (see Figures 1 and 3) including the steps of:

- forming a first lens (3 or 19) that has an adjustable focal length and that comprises liquid crystal molecules (12 or 23), the steps involving the steps of:
- providing a polymer lens shaped body (9 or 20);
- arranging an alignment layer (11 or 22) on the polymer body;
- providing a second substrate (9 or 20) having an alignment layer (11 or 22);
- arranging transparent electrodes (10 or 21) directly on the first and second substrates;
- sandwiching a layer of liquid crystal molecules (12 or 23) between the polymer body and the second substrate, thereby forming a lens having an adjustable focal length;
- providing a second lens (1 or 7);
- providing a photo sensor array (8; see the discussion with respect to claim 1 above); and
- arranging the first lens and the second lens and the photo sensor array in fixed configuration forming one unit such

that an adjustable depth of focus is provided for the camera arrangement.

Takahashi et al. does not explicitly disclose arranging a monomer between a first substrate and a mould, such that a lens-shaped monomer body is formed on the first substrate, polymerizing the monomer, thereby forming a lens-shaped polymer body on the first substrate; and removing the mould from the polymer body. However, one of ordinary skill in the art would have found it obvious to form the acrylic resin (i.e. polymer) lens-shaped bodies (9 or 20) taught by Takahashi et al. with a well known moulding process, as suggested by these limitations, including applying a monomer to a substrate and mould, polymerizing the monomer with UV radiation and removing the mould to form elements 9 and/or 20 of Takahashi et al., as moulding process are very routine and well within the level of ordinary skill in the art.

Regarding claim 11; it is within the level of ordinary skill in the art to heat a monomer to the appropriate temperature during polymerization, including temperatures in a range from 30 to 120 degrees Celcius, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233) and that discovering an optimum value of a result effective variable involves only routines skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Regarding claim 12; one of ordinary skill in the art would have found it obvious to use capillary forces to aid in inserting liquid crystal material into the

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lens disclosed by Takahashi, since the use of capillary forces to insert liquid crystal material into liquid crystal cells is very elementary, well known, and commonly practiced in the art.

Regarding claim 13; spacer elements shown at the top and bottom of lenses 3 and 19, seal the LC cell and space the substrates.

Regarding claim 16; the alignment layers may have essentially parallel but opposite alignment directions.

Claims 1, 3-7 and 9-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al. (US 6,288,767 B1).

Regarding claim 1; Murata et al. discloses a camera arrangement (see Figure 1) integrally comprising at least two lenses (1, 2, 4, 5, 6, 7) and a photo sensor array (CCD, 24) in a fixed configuration forming one unit, wherein a first lens (4) of the lenses has an adjustable focal length and comprises:

- a first liquid crystal cell comprising a first alignment surface (17) and a second alignment surface (14), at least one of the alignment surfaces being a lens-shaped surface (17) defined by a body (10), the liquid crystal cell further comprising a layer of liquid crystal molecules (20) that have an anisotropic index of refraction and that are arranged between the alignment surfaces such that a predefined molecule orientation is induced; and
- a pair of electrodes (16, 12) provided on opposite sides of the layer of liquid crystal molecules (20) and operative to

- control an index of refraction in the layer of liquid crystal molecules by means of an electric field applied therein;
- wherein the lenses are arranged in a fixed configuration such that the camera arranged has an adjustable depth of focus.

Murata et al. does not specifically state that body (10) defining the lens shape is a polymer. However, it would have been obvious to one of ordinary skill in the art to use a lens body (10) made of a polymer (for example, acrylic resin) in place of the glass lens body disclosed by Murata et al. in order to incorporate readily available, well known elements in the device (acrylic lenses are well known in the art), and/or to reduce the weight of the device and the handling costs associated therewith.

Regarding claim 3; the first lens (4) comprises a second liquid crystal cell (13, 15, 21, 19, 18, 11) having a molecule orientation that is essentially perpendicular to the molecule orientation in the first liquid crystal cell (10, 16, 17, 20, 14, 12), such that the two liquid crystal cells are operative for light of opposite polarization, whereby the first lens is adjustable for randomly polarized light (see column 11, lines 16-42).

Regarding claim 4; the second lens has an adjustable focal length and the first and second lenses are arranged such that the camera arrangement has an adjustable depth of field (see column 1, line 64, through column 2, line 4; column 5, lines 8-15; and column 9, lines 42-46).

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Regarding claim 5; additional electronic components are inherently required to receive the electric signal produced by the CCD for display and/or viewing.

Regarding claim 6; the recitation "mobile phone" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Regarding claims 7, 9, 10, 15 and 17; Murata al., as discussed above with respect to claim 1, teaches a method of manufacturing a camera arrangement (see Figure 1) including the steps of:

- forming a first lens (4) that has an adjustable focal length and that comprises liquid crystal molecules (20), the steps involving the steps of:
- providing a polymer lens shaped body (10; see the discussion with respect to claim 1 above);
- arranging an alignment layer (17) on the polymer body;
- providing a second substrate (9) having an alignment layer (14);

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- arranging transparent electrodes (16, 12) directly on the first and second substrates;
- sandwiching a layer of liquid crystal molecules (20) between the polymer body and the second substrate, thereby forming a lens having an adjustable focal length;
- providing a second lens (1, 2, 5, 6, or 7);
- providing a photo sensor array (24); and
- arranging the first lens and the second lens and the photo sensor array in fixed configuration forming one unit such that an adjustable depth of focus is provided for the camera arrangement.

Murata et al. does not explicitly disclose arranging a monomer between a first substrate and a mould, such that a lens-shaped monomer body is formed on the first substrate, polymerizing the monomer, thereby forming a lens-shaped polymer body on the first substrate; and removing the mould from the polymer body. However, one of ordinary skill in the art would have found it obvious to form the a polymer lens-shaped bodies (10) with a well known moulding process, as suggested by these limitations, including applying a monomer to a substrate and mould, polymerizing the monomer with UV radiation and removing the mould to form elements 10 and/or 11 of Murata et al., as moulding process are very routine and well within the level of ordinary skill in the art.

Regarding claim 11; it is within the level of ordinary skill in the art to heat a monomer to the appropriate temperature during polymerization, including

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temperatures in a range from 30 to 120 degrees Celcius, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233) and that discovering an optimum value of a result effective variable involves only routines skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Regarding claim 12; one of ordinary skill in the art would have found it obvious to use capillary forces to aid in inserting liquid crystal material into the lens disclosed by Murata, since the use of capillary forces to insert liquid crystal material into liquid crystal cells is very elementary, well known, and commonly practiced in the art.

Regarding claims 13, 14; the tips of substrate 10 at the top and bottom portions extend toward substrate 9 in a manner, such that the tips form spacer elements to space the main bodies of the two substrates from each other and the spacers elements are formed as an integral part of body 10.

Regarding claim 16; the alignment layers may have essentially parallel but opposite alignment directions.

Allowable Subject Matter

Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or reasonably suggest:

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- a method, as defined in claim 8, wherein a sensor surface of the photo sensor array is exploited as one of the first and second substrate.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

The following references disclose well known moulding method for forming polymer lenses:

Sarofeen (US 2,964,501)

Lankman (US 3,211,811)

Grandperret (US 3,278,654)

Campbell (US 3,605,195)

Crandon et al. (US 3,902,693)

Clark et al. (US 4,197,266)

Fogarty (US 5,160,749)

The following reference disclose liquid crystal lenses:

Tanigaki (US 2003/0071932 A1)

Toda et al. (US 5,047,847)

Hara (JP 11-112849 A)

Nishioka et al. (JP 61-156-228 A)

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Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (571) 272-2345. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Uyen-Chau Le can be reached on (571) 272-2397. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562.

/Michelle R. Connelly-Cushwa/
Primary Patent Examiner
Art Unit 2874